

AMENDMENTS TO THE CLAIMS

The listing of the claims will replace the previous version, and the listing of the claims:

LISTING OF THE CLAIMS

1. (currently amended) A method for obtaining an accurate mixing ratio of a liquid mixture in a liquid transfer device with a low pressure gradient function, comprising:

providing a pump chamber having a plunger to provide suction and discharge operations;

mixing at least two different liquids at a predetermined mixing ratio by changing a switching timing of switch valves, said at least two different liquids being sucked into the pump chamber alternately by operation of the plunger and by switching the switch valves to thereby determine an actual mixing ratio of the at least two different liquids mixed together;

calculating a mixing ratio error as a difference between said actual mixing ratio and said predetermined mixing ratio;

storing said mixing ratio error in a memory; ~~and~~

correcting the switching timing of the switch valves for the at least two different liquids based on said stored mixing ratio error in operating the plunger for a ~~next~~ practical operation subsequently performed to thereby obtain the accurate mixing ratio of the at least two different liquids; and

sequentially transferring said at least two different liquids as the practical operation by opening and closing the switch valves for the liquids, said switching timing of the switch valves being corrected for subsequent transfer of the at least two different liquids.

2-3. (cancelled)

4. (currently amended) A liquid transfer device with a low pressure gradient function for transferring a mixture of at least two different liquids as a mobile phase for an analytical apparatus, comprising:

a plurality of switch valves connected to said at least two different liquids, respectively;

a pump having a pump chamber with an outlet and an inlet connected to said switch valves, and a plunger slidably situated in the pump chamber for transferring the liquids to the pump chamber alternately through the switch valves to prepare a mixture thereof;

a mixing ratio calculation portion for determining an actual mixing ratio of the mixture mixed at a predetermined mixing ratio by said pump;

a mixing ratio error calculation portion for calculating a mixing ratio error as a difference between said actual mixing ratio calculated by said mixing ratio calculation portion and the predetermined mixing ratio electrically connected to said mixing ratio calculation portion;

a memory portion for storing said mixing ratio error calculated by said mixing ratio error calculation portion electrically connected to said mixing ratio error calculation portion; and

a valve-switching-timing correction portion for correcting a switching timing of the switch valves based on the mixing ratio error stored in said memory portion in operating the plunger for a ~~next~~ practical operation subsequently performed to thereby obtain an accurate mixing ratio of the liquids in the practical operation, said valve-switching-timing correction portion being electrically connected to said mixing ratio error calculation portion, said memory portion, and said plurality of switch.

5.(previously presented) A liquid transfer device according to claim 4, wherein said pump further includes a cam connected to the plunger, a motor connected to the cam for reciprocating the plunger, and a position sensor connected to the motor for detecting a position of the plunger through the motor.

6.(original) A liquid transfer device according to claim 5, further comprising a mixer for mixing the mobile phase connected to the outlet of the pump, an injector portion connected to the mixer for injecting a sample into the mobile phase, a column portion for separating the sample connected to the injector portion, and a detector for detecting the sample connected to the column portion.

7.(currently amended) A liquid chromatograph comprises:

- a liquid transfer device with a low pressure gradient function including a pump chamber having an inlet and an outlet, a plunger slidably situated in the pump chamber, and a plurality of switch valves connected to the inlet for changing liquids to be transferred at a predetermined timing for transferring the liquids sequentially as a mobile phase by an operation of the plunger to have a predetermined mixing ratio;

- a mixing ratio calculation portion for determining an actual mixing ratio of said mobile phase by the liquid transfer device actually operated based on the predetermined mixing ratio;

- a mixing ratio error calculation portion for calculating a mixing ratio error as a difference between said actual mixing ratio calculated by said mixing ratio calculation portion and the predetermined mixing ratio electrically connected to said mixing ratio calculation portion;

- a memory portion for storing said mixing ratio error calculated by said mixing ratio error calculation portion

electrically connected to said mixing ratio error calculation portion; and

a valve-switching-timing correction portion for correcting a switching timing of the switch valves based on the mixing ratio error stored in said memory portion in operating the plunger for a ~~next~~ practical operation subsequently performed to thereby obtain an accurate mixing ratio of the liquids in the practical operation, said valve-switching-timing correction portion being electrically connected to said mixing ratio error calculation portion, said memory portion, and said plurality of switch valves.

8.(original) A liquid chromatograph according to claim 7, further comprising a detector for obtaining information of the actual mixing ratio of the mobile phase, said mixing ratio calculation portion calculating the actual mixing ratio based on a signal from said detector.

9.(original) A liquid chromatograph according to claim 8, further comprising a mixer for mixing the mobile phase connected to the liquid transfer device, an injector portion connected to the mixer for injecting a sample into the mobile phase, and a column portion for separating the sample connected to the injector portion, said detector being connected to the column portion.

10. (new) A method according to claim 1, wherein in a step of subsequently transferring the at least two different liquids as the practical operation, the switching timing of the switch valves is corrected in every gradient cycle by using the mixing ratio error calculated and stored in the memory.

11. (new) A liquid transfer device according to claim 4, wherein in the valve-switching-timing correction portion, the switching timing

of the switch valves is corrected in every gradient cycle by using the mixing ratio error calculated at the mixing ratio error calculation portion and stored in the memory portion.

12. (new) A liquid chromatograph according to claim 7, wherein in the valve-switching-timing correction portion, the switching timing of the switch valves is corrected in every gradient cycle by using the mixing ratio error calculated at the mixing ratio error calculation portion and stored in the memory portion.